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Supplementary Materials for

Early formation of the Moon 4.51 billion years ago

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The PDF file includes:

- fig. S1. $^{176}Hf/^{177}Hf$ ratios normalized to the expected (present-day) value for standard zircons versus the magnitude of the peak stripping due to interfering Yb, measured as $^{173}Yb^{+}/^{177}Hf^{+}$.
- fig. S2. Initial $^{176}Hf/^{177}Hf$ of Apollo 14 zircons versus absolute time (My) and time after the start of the solar system [calcium- and aluminum-rich inclusions (CAIs)] in millions of years.
- fig. S3. Hf model age variations depending on the $^{176}Lu/^{177}Hf$ ratios for the source.
- fig. S4. KREEP $^{176}Lu/^{177}Hf$ evolutions through decreasing melt percent, as given by pMELTS simulations.
- References (*58*, *59*)

Other Supplementary Material for this manuscript includes the following:
(available at advances.sciencemag.org/cgi/content/full/3/1/e1602365/DC1)

- table S1A (Microsoft Excel format). U-Pb isotopic data (zircons also measured for Hf isotope composition and used for the determination of the age of the Moon).
- table S1B (Microsoft Excel format). U-Pb isotopic data (zircons not measured for Hf isotope composition).
- table S2 (Microsoft Excel format). Tuning parameters of the coupled Cetac “Aridus II” and ThermoFinnigan Neptune MC-ICPMS.
- table S3A (Microsoft Excel format). Hf isotopic data and model age calculations for lunar zircons.
- table S3B (Microsoft Excel format). Summary of Hf isotopes measured on terrestrial standards.

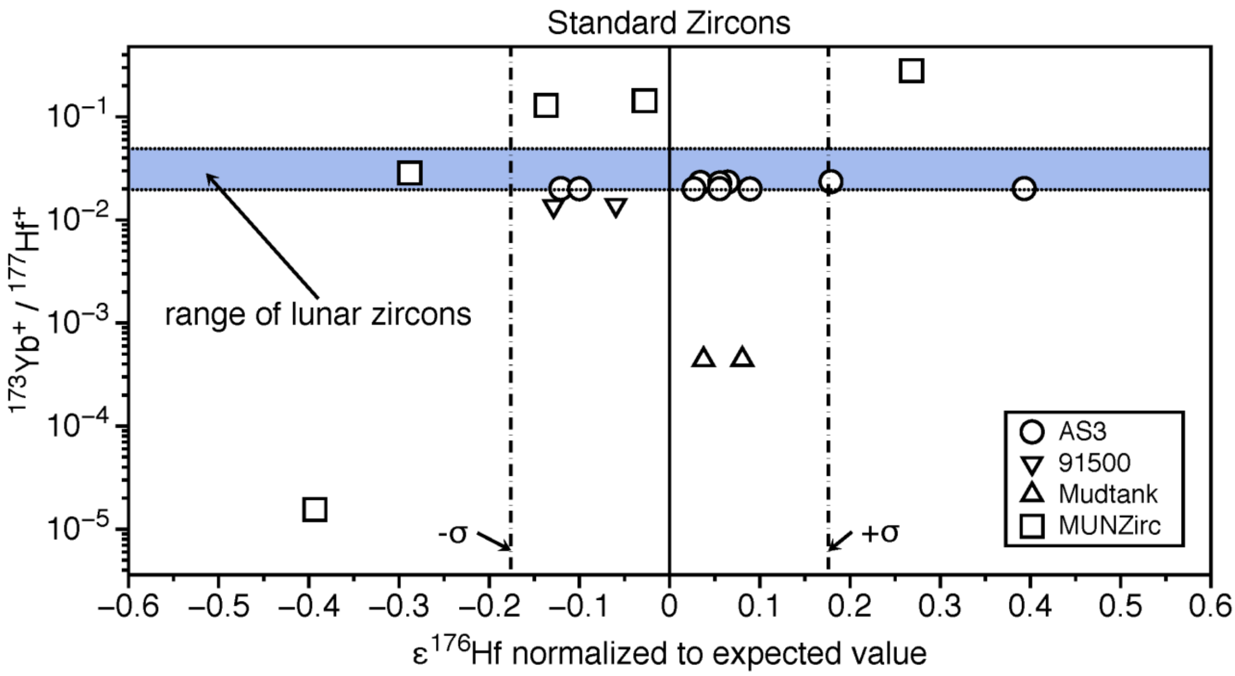

fig. S1. $^{176}Hf/^{177}Hf$ ratios normalized to the expected (present-day) value for standard zircons versus the magnitude of the peak stripping due to interfering Yb, measured as $^{173}Yb^+/^{177}Hf^+$. The ε^{176}Hf values are adjusted by a constant offset of -0.54 ε measured on standard analyses; one standard deviation are indicated by the dashed lines. No systematic shift in ε^{176}Hf is observed for widely variable peak-stripping contributions. The range of Yb contribution for the lunar zircons analyzed here is indicated by the colored area.

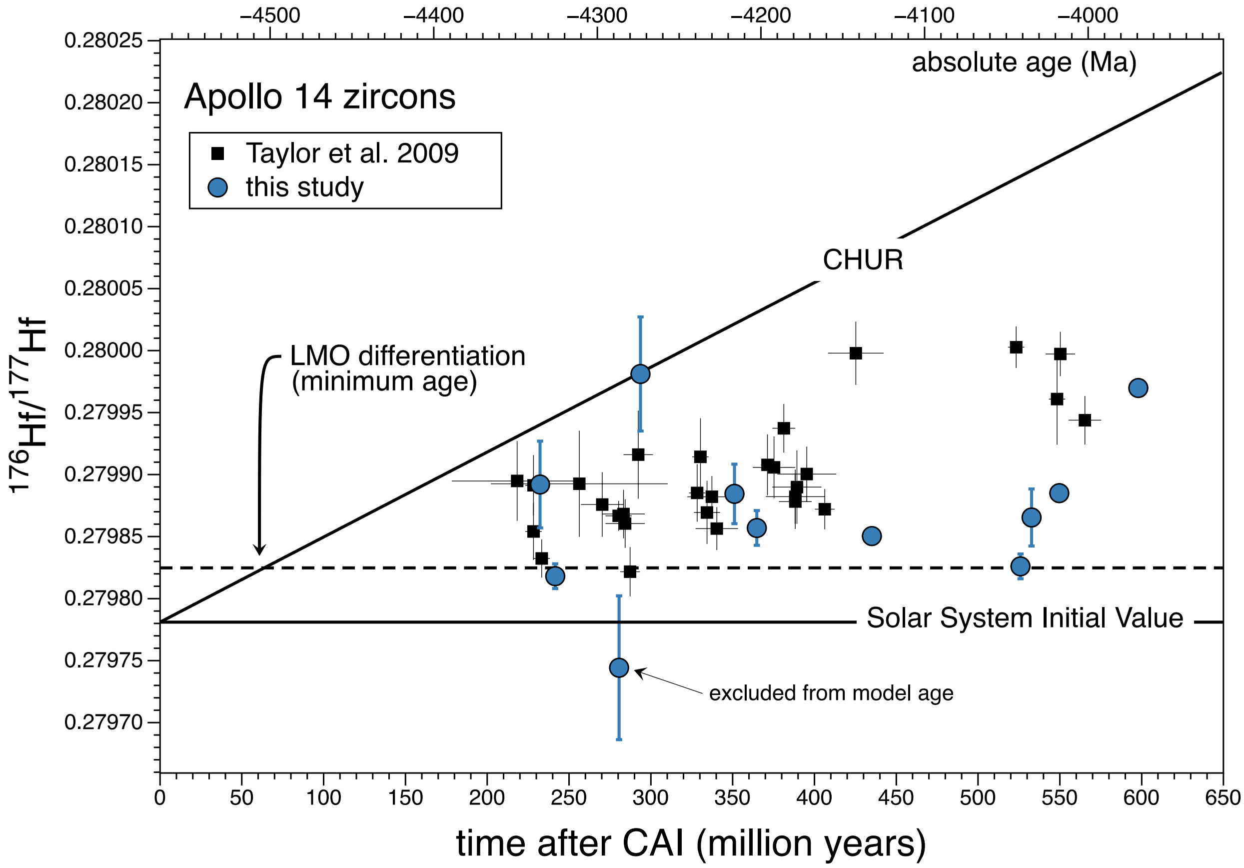

fig. S2. Initial $^{176}Hf/^{177}Hf$ of Apollo 14 zircons versus absolute time (My) and time after the start of the solar system [calcium- and aluminum-rich inclusions (CAIs)] in millions of years. Solar system initial value, the CHUR evolution line, and the Lu/Hf model age for Lu/Hf =0 in the source magma of the zircons (dashed line) are also shown. Errors are 1σ.

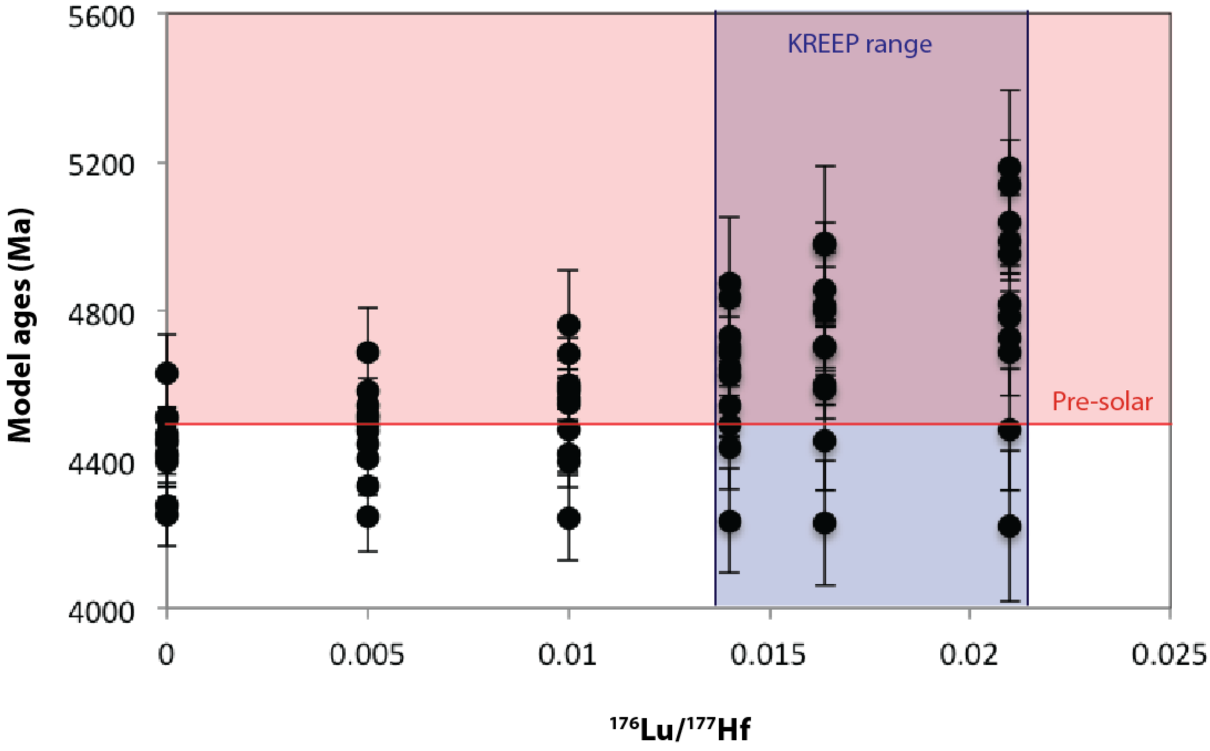

fig. S3. Hf model age variations depending on the $^{176}Lu/^{177}Hf$ ratios for the source. Calculation made for the Apollo 14 zircons analyzed in this study using different $^{176}Lu/^{177}Hf$ ratios for the source. KREEP range from Warren and Wasson (*33*) and Warren (*54*)

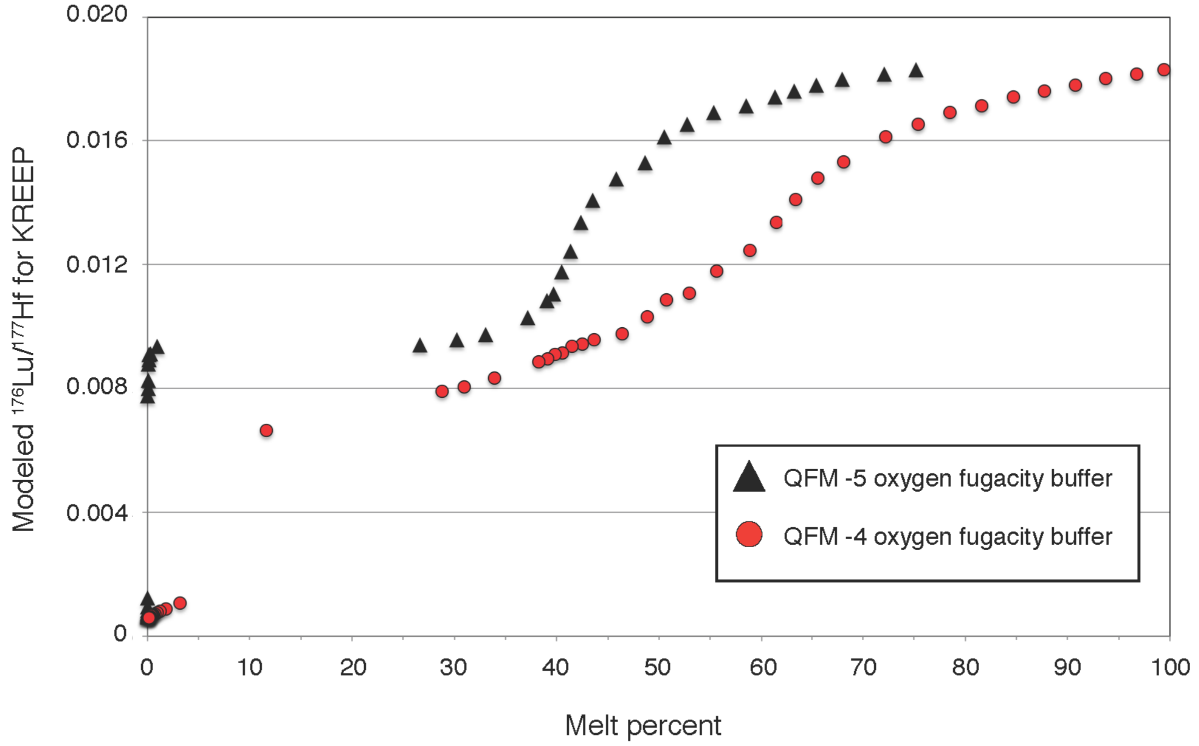

fig. S4. KREEP $^{176}Lu/^{177}Hf$ evolutions through decreasing melt percent, as given by pMELTS simulations.